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Authors: G.F. Salem, E.A.A. El-Shazly, A.A.M. Farag, I.S. Yahia



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Spectrophotometric investigations of optical linearity and nonlinearity of Pentacene/ITO nanostructure thin film

G. F. Salem¹, E.A.A. El-Shazly¹, A.A.M. Farag^{1,2*}, I.S. Yahia^{3,4,5}

¹ Thin Film and Solar Cells Laboratory, Physics Department, Faculty of Education, Ain Shams University, Cairo, 11757, Egypt

²Physics Department, Faculty of Arts and Sciences, Jouf University, Jouf, Saudi Arabia

³Research Center for Advanced Materials Science (RCAMS), King Khalid University, Abha 61413, P.O. Box 9004, Saudi Arabia.

⁴Advanced Functional Materials & Optoelectronic Laboratory (AFMOL), Department of Physics, Faculty of Science, King Khalid University, P.O. Box 9004, Abha, Saudi Arabia.

⁵Nanoscience Laboratory for Environmental and Bio-Medical Applications (NLEBA), Semiconductor Lab., Metallurgical Lab., Physics Department, Faculty of Education, Ain Shams University, Roxy, 11757 Cairo, Egypt.

***Corresponding author: A.A.M.Farag**

***Email Address:** alaafaragg@gmail.com, aamfaraj@ju.edu.sa

Abstract

The linear and non-linear optical properties of pentacene films were measured at 300 K in the UV-Vis-NIR region depending on the measurements of both transmission and reflection. The results of XRD pattern demonstrated the presence of polycrystalline nature as well as the nanostructure characteristics. The mean crystallite size and the microstrain parameters of pentacene were acquired to be 19.15 nm and 6.05×10^{-5} , respectively. The type of the optical transition is directly allowed with optical band gaps of 1.57, 2.58 and 3.60 eV. The optical dispersion parameters were acquired and studied as a function of wavelength. The well-known spectroscopic technique is utilized to describe and evaluate the nonlinear optical susceptibilities due to its correlation with the linear refractive index. The spectral behavior of hyperpolarizability and the second order refractive index of pentacene films was achieved. The results emphasize the viability of creating photodetector

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